CLAIMS

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1. An on-chip multi-layer metal-shielded monolithic transmission line comprising:

plural parallel planar thin film, conductive layers and

plural planar thin film nonconductive separator layers disposed such that each adjacent pair of the conductive layers is separated by one of said plurality of planar thin film nonconductive layers to form a stack of alternating conductive and nonconductive layers.

2. The invention of Claim 1 wherein an initial and a final ones of said conductive layers form a top and a bottom conductive planes.

3. The invention of Claim 2 wherein the conductive planes are disposed to provide a mutually registered selected width of the stack.

4. The invention of Claim 3 wherein a center one of the conductive layers comprises three laterally spaced apart conductive strips.

5. The invention of Claim 4 wherein the conductive strips are separated by a pair of nonconductive spacer layers.

6. The invention of Claim 5 wherein two laterally spaced terminal strips of the three conductive strips are spaced at the selected width.

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7. The invention of Claim 6 wherein the center conductive strips provides a signal carrying path.

8. The invention of Claim 7 wherein each of the nonconductive separator layers provide a plurality of vias between the two laterally spaced terminal strips of the three conductive strips and the conductive planes.

9. The invention of Claim 8 wherein the vias are filled with conductive material for electrically interconnecting said conductive strips and planes so as to form a conductive shield about the centermost of the three conductive strips for electrical isolation thereof.

10. An on-chip multilayer metal-shielded monolithic transmission line comprising:

a plurality of parallel planar thin film, conductive layers, each adjacent pair of the conductive layers separated by one of a plurality of planar thin film nonconductive separator layers to form a stack of alternating conductive and nonconductive said layers;

an initial one and a final ones of said conductive layers forming a top and a bottom conductive planes, the conductive planes establishing a mutually registered selected width of the stack;

one of the conductive layers between the top and the bottom conductive planes comprising three laterally spaced apart conductive strips separated by a pair of nonconductive spacer layers, the two laterally terminal of the three conductive strips being spaced at the selected width, the center one of the conductive strips providing a shielded signal carrying path;

each of the other of the conductive layers between the one of the conductive layers and the top one of the conductive planes, and between the one of the conductive layers and the bottom one of the conductive planes, comprising a pair of laterally spaced apart conductive strips separated by a nonconductive spacer layer so that the pair of laterally spaced apart conductive strips are spaced at the selected width; and

each of the nonconductive separator layers providing a plurality of metal filled vias conductively joining the two outermost of the three conductive strips of the one of the conductive layers, and the spaced apart conductive strips of the other of the conductive layers, and the conductive planes, so as to form a conductive shield about the centermost of the three laterally spaced apart conductive strips.

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11. A plurality of on-chip multi-layer metal-shielded monolithic transmission lines comprising:

a plurality of parallel planar thin film, conductive layers, each adjacent pair of the conductive layers separated by one of a plurality of planar thin film nonconductive separator layers to form a stack of alternating conductive and nonconductive said layers;

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an initial and a final ones of said conductive layers forming a top and a bottom conductive planes, the conductive planes establishing a mutually registered selected width of the stack;

one of the conductive layers between the top and the bottom conductive planes comprising a plurality of N laterally spaced apart conductive strips, where N is an odd integer, each laterally adjacent pair of the conductive strips separated by a nonconductive spacer layer forming N-1/2 signal carrying ones of the conductive strips, the two laterally terminal of the plurality of conductive strips being spaced at the selected width;

each of the other of the conductive layers between the one of the conductive layers and the top one of the conductive planes, and between the one of the conductive layers and the bottom one of the conductive planes, comprising a plurality of [(N-1)/2]+1 laterally spaced apart conductive strips, each laterally adjacent pair of the conductive strips separated by a nonconductive spacer layer, the two laterally terminal of the plurality of conductive strips being spaced at the selected width; and

the nonconductive separator layers providing a plurality of metal filled vias positioned for electrically interconnecting a plurality of the conductive strips so as to electrically isolate each of (N-1)/2 of the signal carrying conductive strips.

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12. The transmission lines of Claim 11 wherein the vias of one of the transmission lines are staggered relative to the vias of an adjacent one of the transmission lines so as to preclude an electromagnetic line of sight path between the signal carrying conductive strips of the transmission lines.

13. A method of making an on-chip three layer metal-shielded monolithic transmission line comprising the steps of:

forming a plurality of parallel planar thin film, conductive layers, separated by a plurality of planar thin film nonconductive separator layers to form a stack of alternating conductive and nonconductive said layers;

extending an initial one and a final ones of said conductive layers, as a top and a bottom conductive planes, to define a mutually registered selected width of the stack;

forming one of the conductive layers between the top and the bottom conductive planes into a plurality of N laterally spaced apart conductive strips, where N is an odd integer;

separating each laterally adjacent pair of the conductive strips by a resp nonconductive spacer layer and spacing the two laterally terminal of the plurality of conductive strips at the selected width;

separating each of the other of the conductive layers between the one of the conductive layers and the top one of the conductive planes, and between the one of the conductive layers and the bottom one of the conductive planes, into a plurality of [(N-1)/2]+1 laterally spaced apart conductive strips;

separating each laterally adjacent pair of the conductive strips by a resp nonconductive spacer layer, the two laterally terminal of ~~the plurality~~ of conductive strips being spaced at the selected width; and

filling a plurality of vias in the nonconductive separator layers with a conductor material to electrically interconnect a plurality of the conductive strips so as to electrically isolate each of (N-1)/2 signal carrying ones of the conductive strips.

14. The method of Claim 13 further comprising the step of staggering the position of the pair vias of one of the transmission lines relative to the pair vias of an adjacent one of the transmission lines so as to preclude an electromagnetic line of sight path between the signal carrying conductive strips of the transmission lines.